

Sodium Hyaluronate (HA) Supplementation of a Glycerol-based Blastocyst (BL) Vitrification Solution Supports High Survival and Implantation of PGS-BLs.

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Background: The success of BL vitrification (VTF) has greatly facilitated single ET and Day5/6 trophectoderm biopsy/PGS as practical ART options. HA is a known cellular adhesion molecule that potentially promotes membrane stabilization of cryopreserved tissue/cells.

Design: Prospective, randomized study

Methods: Beginning in 2012, we prospectively vitrified PGS cases with (+) or without (-) HA for Day 6 or D5 BLs, respectively. In Phase II, we randomly assigned all PGS cases to VTF to, by patient +HA or -HA. Aseptic microSecure (μ S) -VTF was applied to all PGS-BLs using I.C.E. V-BL solutions/3-step dilution. Thirty warming cycles were conducted and chi-squared analysis was performed to compare survival rates, pregnancy outcomes and implantation rates.

Results: The mean age (\pm SE) of PGS patients was 35.1 ± 1.6 (-HA, n=13) and 35.4 ± 1.4 (+HA, n=17). μ S-VTF resulted in over 99% survival of PGS- BLs independent of HA supplement. Furthermore, no difference ($P \geq 0.2$) in clinical pregnancy rates (+HA: 94.1%; -HA: 84.6%) or implantation rates (+HA: 87.5%; -HA: 72.0%) was determined to-date, eventhough the mean number of BLs transferred tended to be lower in the +HA group (1.33 vs 1.67). All single euploid BL VETs (17 of 30) resulted in a pregnancy.

Discussion: μ S-VTF is an extremely effective method for the cryopreservation of trophectoderm biopsied BLs, one that offers superior security with weld seals, in-situ vapor storage and dual-colored, tamperproof labeling. In combination with I.C.E. BL-VTF glycerol-based solutions, BL viability remains unchanged from its fresh-state. The addition of a large macromolecule like HA offers dual support by increasing both the viscosity of the VTF solution and supplemental cellular adhesion/membrane stabilization. If the trend toward higher implantation rates +HA becomes significant with a higher sample size, it would support the latter theory, as all BLs are cultured and transferred in the presence of HA.